The Model Heating Co

Philadelphia and Chicago.

A BOOKLET CONCERNING THE

MODEL BOILER

FOR

STEAM OR WATER HEATING.

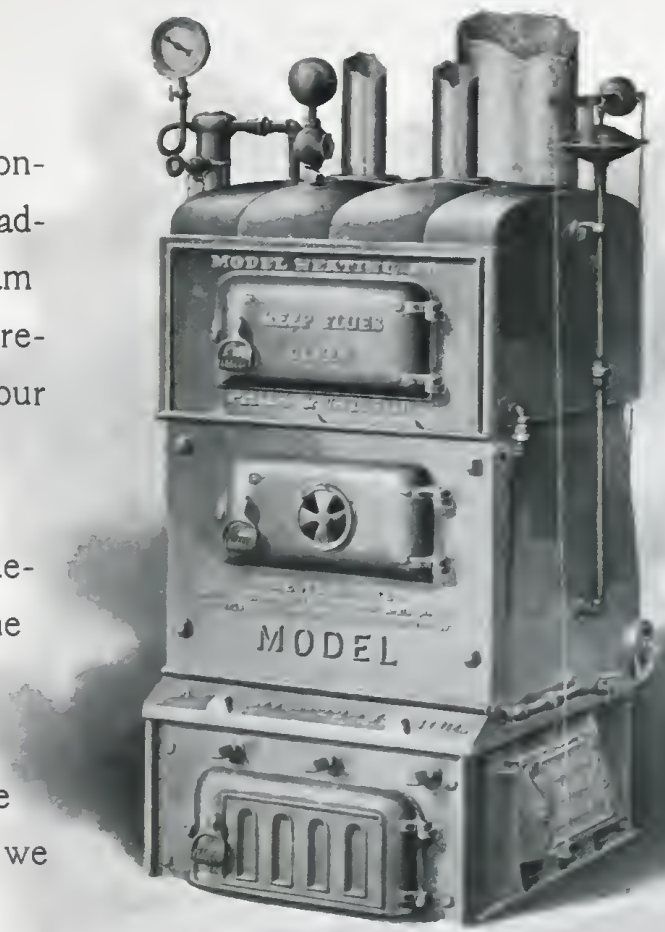
MADE BY

MODEL HEATING CO.

PHILADELPHIA, American and Dauphin Sts

CHICAGO, 52 Dearborn St.

OF course, you have considered the many advantages in favor of steam and hot-water heating, whereby you are assured that your house can be thoroughly and uniformly heated throughout, and have decided to adopt one or the other of these modern systems. So while your architect is "drawing the model" of your house, we



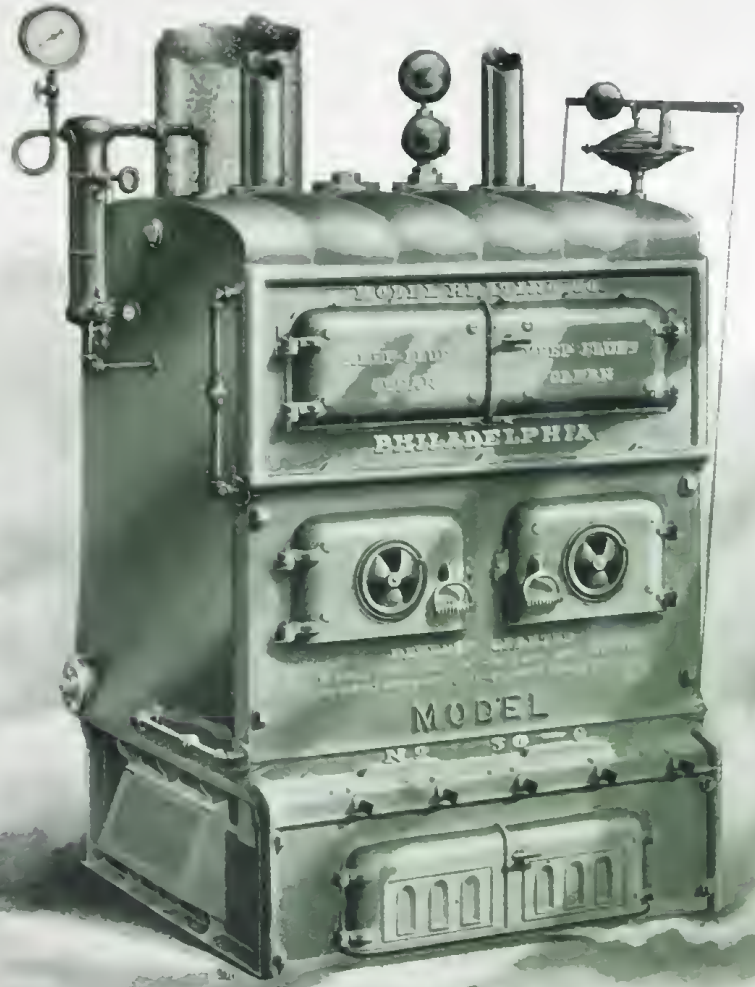
will endeavor to interest you in another model, the "Model Boiler," drawn and constructed especially with reference to domestic use, and which has all the requisites of a first-class boiler and several very desirable new features not found in any other. Grate surface, fire surface, and fire travel are common to all boilers, but upon

the character and disposition of these essentials depends the value of the boiler. In the Model, we believe we have reached the "ne plus ultra" of construction for securing the greatest utility from these necessities.

The Model Boiler is made entirely of cast iron and the sections set vertically on the base, forming what

is styled a cast-iron vertical section boiler. Does it impress you at first glance as differing in appearance from any vertical type boiler you ever saw? Well, it is different, and this is the distinctive feature. We all seem to inherit certain manners and methods of doing things, and to accomplish certain ends and results entail upon

ourselves labor altogether unnecessary, both because we have always seen them done that way, and because we did not know there were easier and better methods. We see the results of this in mechanical construction as well. The very latest forms of the horseless carriage have the leather



dash-board in front to protect the riders against the mud from the heels of the absent animals. So in boiler construction old lines have been followed with practically little variation in results as regards efficiency and in great monotony of appearance. The Model is the first departure from the old

lines, and the change consists of putting the front of the boiler on the side and building the boiler sideways. The old styles all have the front on the end of the boiler, and in building the boiler, sections are placed one behind the other. We did not make this innovation just for fun or to be different

from others, but the principle and the reason will appear later. The second distinctive feature is the Model's adaptability to any kind of fuel. You are not compelled to use some particular kind or quality to develop its efficiency, for it does its work equally well whether hard coal, soft coal, coke, wood, or gas

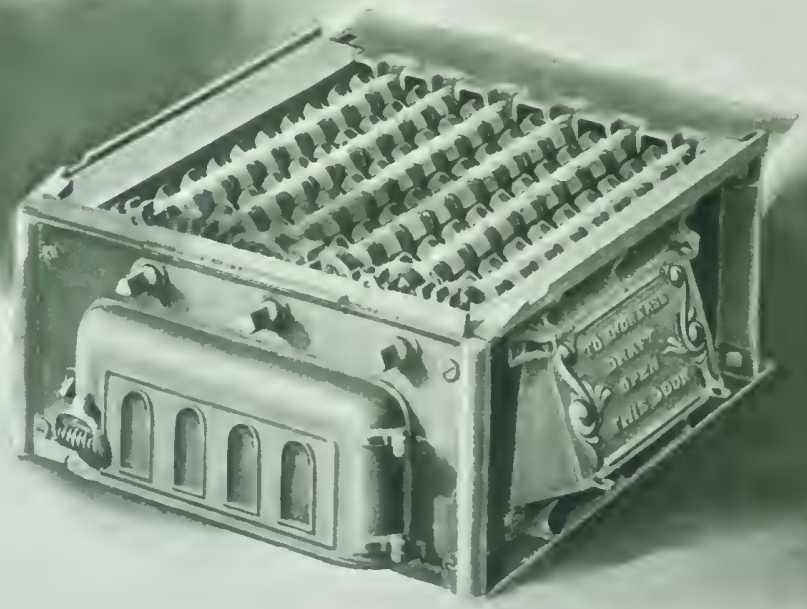
is used. This always is, and should be, a great consideration when purchasing a boiler, it being a matter of economy often and occasionally one of necessity to vary the kind of fuel. This convenience is peculiar to the Model boiler.

Another feature, by no means insignificant, is its adaptability, on account of height, to almost any cellar. This frequently saves heavy expense in excavating, and allows more pitch to be given to the cellar pipes, which is greatly to the advantage of the heating system.

The three, four and five section boilers when set up complete for water appear as on page 4, for steam as on page 3. All boilers having more than five sections look like the pictures on page 5 for steam and page 6 for water.

By doubling the doors on all large sizes we obviate the great weight of a single one of the same size, and in addition provide for more thorough access to all parts.

The base which forms the ash-pit, deep and ample for the ashes of any fuel, is so constructed with reference to the grate sections that they can be easily and quickly removed when necessary, and what is even



more important, without touching the boiler proper, or any of its connections. The grate used is the triplex pattern. After forty years of experience with many varieties, we have adopted this style of grate in

all our heating appliances. The very large amount of air spaces admit such quantities of oxygen through the grate to the fuel as are necessary for perfect combustion. The labor required to work the grate is less, and the fire can be kept cleaner than with any other type. Take notice that the grate bars, only three inches wide, are coupled in pairs, and each pair is shaken separately with a crank-shaker attached to the bar, which projects through the front. Instead of requiring the strength of a man to operate a grate which shakes the whole or even half the fire, as is the case with other boilers, a child can easily clean the fires of our largest boilers. There are no niches or projections along the side of the grate or boiler for the accumulation of ashes, and the fire can be kept as clean along the sides of the boiler as in the centre of the grate.

The intermediate sections look like drop tubes. That which looks like a drop tube, we designate a TONGUE. It hangs over the fire chamber and furnishes a very large amount of heating surface below the crown sheet of the boiler. (The crown

sheet is the top of the combustion chamber.)

The amount of direct heating surface, or surface the fire actually shines on, in the Model exceeds that of any other boiler.

This is one feature of the construction which makes the Model economical in the consumption of fuel.

In the first place, the combustion chamber is

large; then these tongues of the intermediate sections, hanging over the bed of fire, get the advantage of great radiant heat, which insures the rapid heating and circulation of the water, and absorbs the heat which in other boilers passes up the chimney.

Look at these tongues and the fire, and we think you must admit the honesty

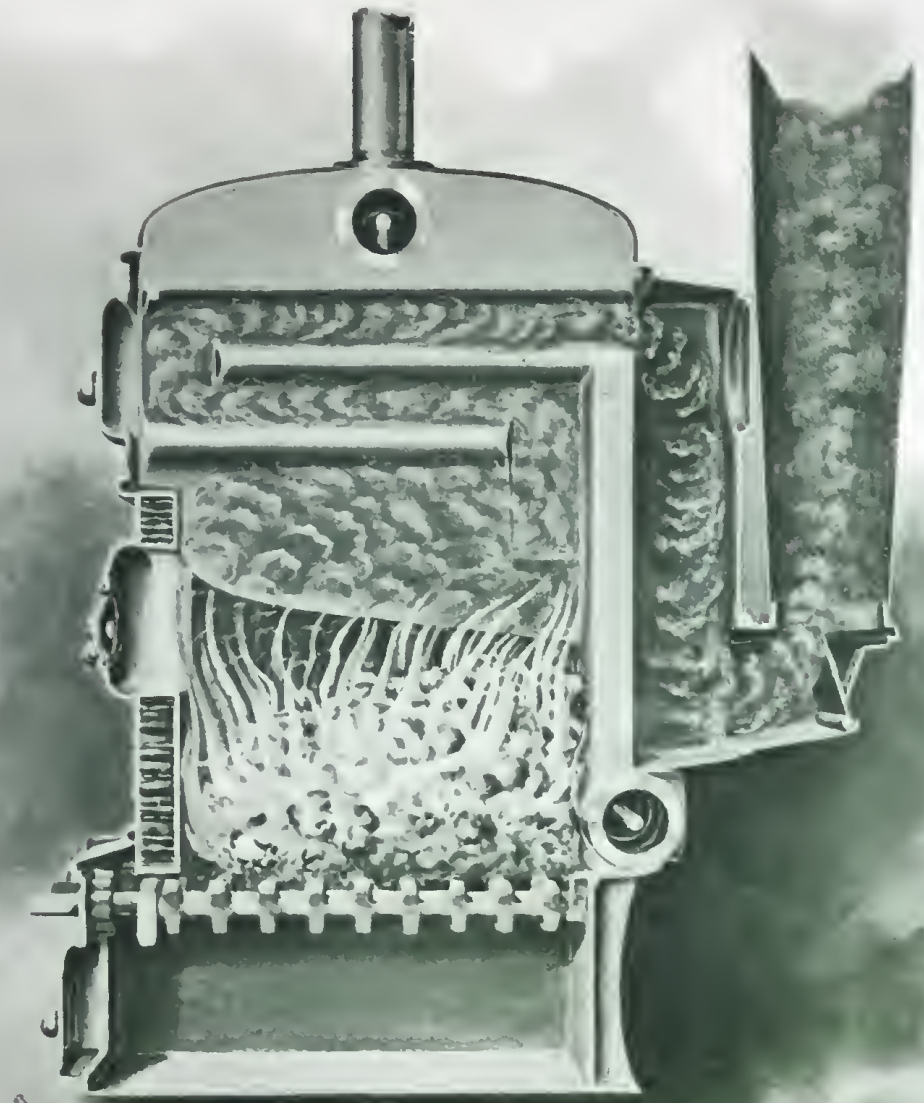
of our claim for a construction insuring economy in fuel. The side sections form the side of the fire-pot, and in conjunction with an intermediate, a flue. The water-front, about which we will speak farther on, is connected to this section by means of the pipes shown in

the picture. The bolts connecting the sections together have their purchase upon this section, and all steam trimmings are attached to it.

The Model is the only boiler made for house heating which adds flue surface and fire surface in exact proportion to grate surface when the size of the boiler is increased.

For, note that the addition of an intermediate section adds, along with the grate section, an entire new flue the full length of the boiler. Here you have the explanation for putting the front on the side of the boiler. Building the boiler by adding sections, one behind the other, you have the same sized flues for all sizes of boilers, and the grate and flue surfaces are not in proportion; while with the Model, this proportion is absolute, and for this reason we can determine the ratings of the boiler consistently. The gases pass from the rear to the front of the boiler through the lower tier of flues, and then to the rear again through

the upper tier. Not satisfied with having them travel the length of the boiler three times, we carry the gases, by means of a smoke-box bolted on the back, down to the bottom of the boiler and thence to smoke-pipe connection. Almost every one



knows, from their experience with furnaces and stoves, the value and economy of the down-draft principle. Note, too, the elliptical shape of the gas

passages or flues. We make them in this form so that the lower part of the flue will get practically as much heat from the gases as they pass through, as the upper part. The hot gases impinging on all the surface add greatly to the available heating surface of the boiler. During this long travel, three times the full length of the boiler, then down to the bottom of boiler, through flues so constructed that every inch is efficient, all the effective heat of the gases is absorbed.

The sections and waterways being vertical, there is no resistance to circulation, which in consequence is easy and natural.

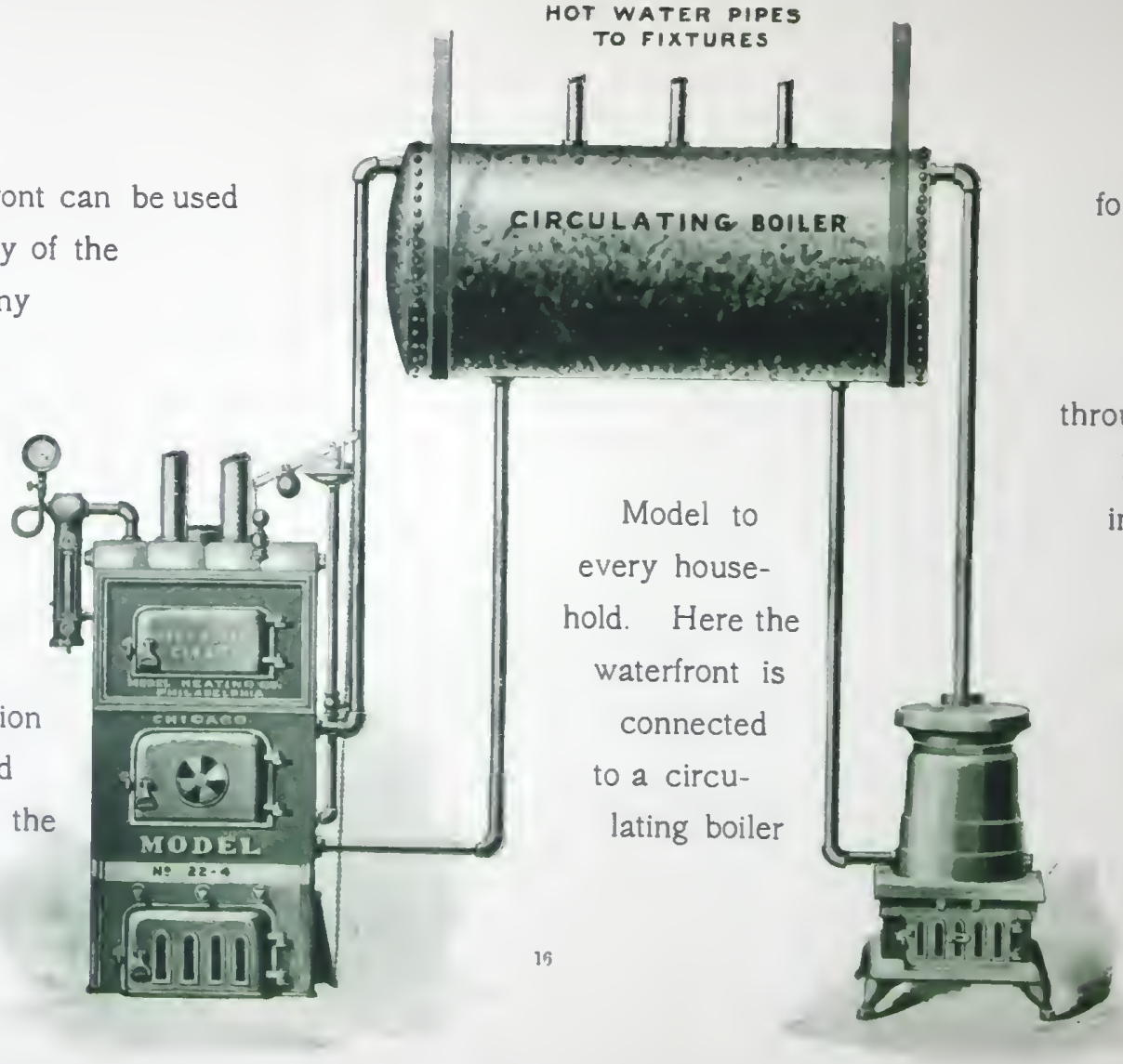
We have shown so many exclusive features that we hesitate to go farther, yet we would omit the description of one very special advantage if we neglected to say that the Model can be cleaned easier and more thoroughly than any boiler made. Not an inch of its surface that cannot be reached, and its cleanliness will depend entirely on the person in charge. The surfaces are smooth, there are no pockets for the

accumulation of soot, and the flue surfaces could be polished if desired If the directions, which we furnish with each boiler, are followed, the dust and soot will all be brushed into the fire and consumed

One more unique feature and we are through We refer to the waterfront— the hollow casting resting

on the front of the base, forming the front of the boiler and through which the feed doors open The manner of connecting this waterfront to the boiler proper is shown on page 11 Here it is simply a part of the boiler, the circulation between it and the boiler being through the pipes on the end

This waterfront can be used independently of the boiler in many ways and without impairing the boiler's efficiency. We show in this cut one application which should recommend the



Model to every household. Here the waterfront is connected to a circulating boiler for supplying hot water for all purposes throughout the house and in any reasonable quantity. The small waterback in the kitchen

range will not supply sufficient water for the majority of families without interfering with the natural uses of the range. Connected, as shown to the Model boiler, you will have all the hot water you require at all times, and get better results with your range. This is an economical suggestion, since you will not have to keep a fire in the range, as is often the case, simply to furnish hot water for the bath. We can regulate the waterfront to give you just the quantity of hot water you need.

As regards mechanical construction, we simply say it is absolutely correct. Our immense plants, long experience and the great number of boilers produced, have enabled us to build and use special machinery and introduce such system in their manufacture, that comparatively speaking they are mechanically as perfect as a sewing machine and accurate as a watch.

THE most faultless and finished contrivance of human genius, of whatever sort, will come short of the object for which it was created if its operation falls into incompetent hands. The house heating boiler is no exception. If it is not provided with a good draft and correctly set and connected up to a properly piped system its efficiency will be impaired if not destroyed.

The best results are obtained when competent heating contractors erect the plant and ordinary intelligence is used in its operation.

For given temperatures of steam or water, it is the amount of radiating surface placed in the rooms and not the size of the boiler which determines the temperature of the house. If the radiation is deficient the house will not be properly warmed.

When your architect "draws your model" instruct him to provide a large chimney flue. It will cost you no more and a good draft is essential for proper combustion resulting in economy of fuel and the development of the full boiler power.

Select a boiler with a rating twenty to twenty-five per cent. in excess of the actual radiating surface placed in the building. You would not start on a long journey with just money enough for the known actual expenses of the trip, nor build a bridge to barely support the actual weight it would have to carry. You would provide a surplus for emergencies or unexpected strains. The same good judgment exercised in purchasing a boiler will insure you a comfortable house no matter how cold the weather.

EXTRACT FROM REPORT OF TEST

MADE ON

THE MODEL BOILER,

By PROFESSOR R. C. CARPENTER, Cornell University.

The Boiler used was No. 22-4, rated at 475 square feet.

The boiler, when operated under the conditions similar to those which existed during the test, should supply 550 feet of direct steam radiation. It would seem to the writer that a rating of 500 square feet of direct radiation which would give a margin of over 10 per cent. would be readily carried in zero weather by a boiler of this size and with a coal consumption not exceeding 4 pounds per square foot per hour.

The results of the test show a very high efficiency indeed, especially when we consider the small size of the heater. The evaporation per pound of combustible 12.33 is rarely attained even with the most efficient power boilers, and so far as the writer knows has not been attained before with a boiler of this class and construction. During the entire test the calorimeter indicated that the steam was very nearly dry, there being but a small fraction of 1 per cent. of moisture.

Duration of trial	hours.	8
DIMENSIONS.		
Total heating surface	square feet	41.2

Water Evaporated Per Hour.		
Feed Water	pounds	124.4
Evaporated into dry steam	"	125.4
Evaporated from and at 212 degrees F.	"	138.
Economic Evaporation.		
Actual per pound of fuel	"	9.79
Equivalent from and at 212 per pound of fuel	"	10.76
Actual per pound of combustible	"	11.21
Equivalent from and at 212 per pound of combustible	"	12.33
Horse Power.		
On basis of 34½ pounds, equivalent evap. per hour		4.
Efficiency.		
Heat generated per hour, British Thermal Units		162400.
Heat absorbed by steam per hour, " "		133298.
Efficiency of boiler, per cent.		81.5
Heat lost by radiation, per cent.		5.5
Heat carried off in flue and ashes, per cent.		13.

In addition to the test as described above, a short test for capacity was operated July 2, during which time the boiler evaporated water at the rate of 300 pounds per hour, which is an amount sufficient to supply 1200 feet of direct radiation, and this may be taken as representing the capacity of the boiler when operated under forced conditions.

RATINGS, DIMENSIONS, ETC.

OF THE

MODEL STEAM BOILERS.

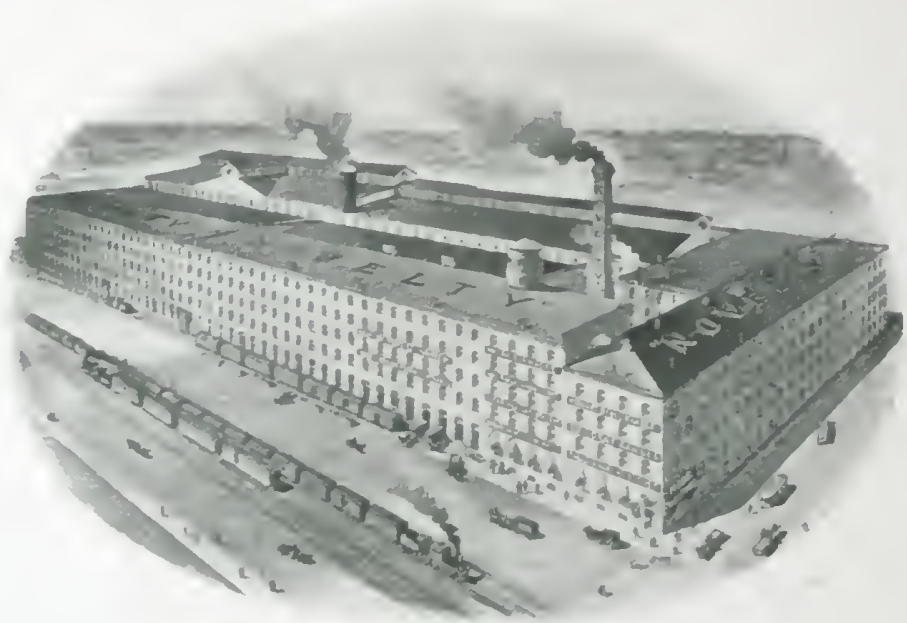
No. of Boiler	12-3	18-3	22-3	18-4	22-4	18-5	22-5	30-4	30-5	30-6	30-7	40-6	40-7	40-8	50-7	50-8	50-9
Dimensions of Grate	12 x 14	18 x 14	22 x 14	18 x 21	22 x 21	18 x 28	22 x 28	30 x 21	30 x 28	30 x 35	30 x 42	40 x 35	40 x 42	40 x 49	50 x 42	50 x 49	50 x 56
No. and Size of Flow Openings	1-2	1-2½	1-3	1-2½	1-3	2-2½	1-3	1-3½	2 3½	2-3½	2-3½	2-4	2-4	2-4	2-4	3-4	3-4
No. and Size of Return Openings	1-2	1-2½	1-3	1-2½	1-3	2-2½	1-3	1-3½	2-3½	2-3½	2-3½	2-4	2-4	2-4	2-4	2-4	3-4
Height of Boiler to top of Outlet	48	48	48	48	48	48	48	59½	59½	59½	59½	62	62	62	67	67	67
Length of Boiler including Smoke Box	36	42	46	42	46	42	46	57	63	63	63	73	73	73	83	83	83
Width of B. includ'g W't'rfr'nt Connecs.	22	22	22	29	29	36	36	32	39	46	53	48	55	62	55	62	69
Depth of Ash-Pit	9	9	9	9	9	9	9	11	11	11	11	11	11	11	11	11	11
Height of Base	12	12	12	12	12	12	12	14	14	14	14	14	14	14	14	14	14
Height of Water Line	43	43	43	43	43	43	43	50	50	50	50	50	50	50	53	53	53
Height from Floor to Centre of Return	14	14	14	14	14	14	14	17	17	17	17	17	17	17	17	17	17
Size of Smoke Pipe	7	7	8	8	9	9	10	10	12	13	14	14	15	16	17	18	19
Direct Radiation Boiler will supply	175	275	325	400	475	525	625	800	1050	1300	1550	1800	2150	2500	2800	3300	3900

RATINGS, DIMENSIONS, ETC.

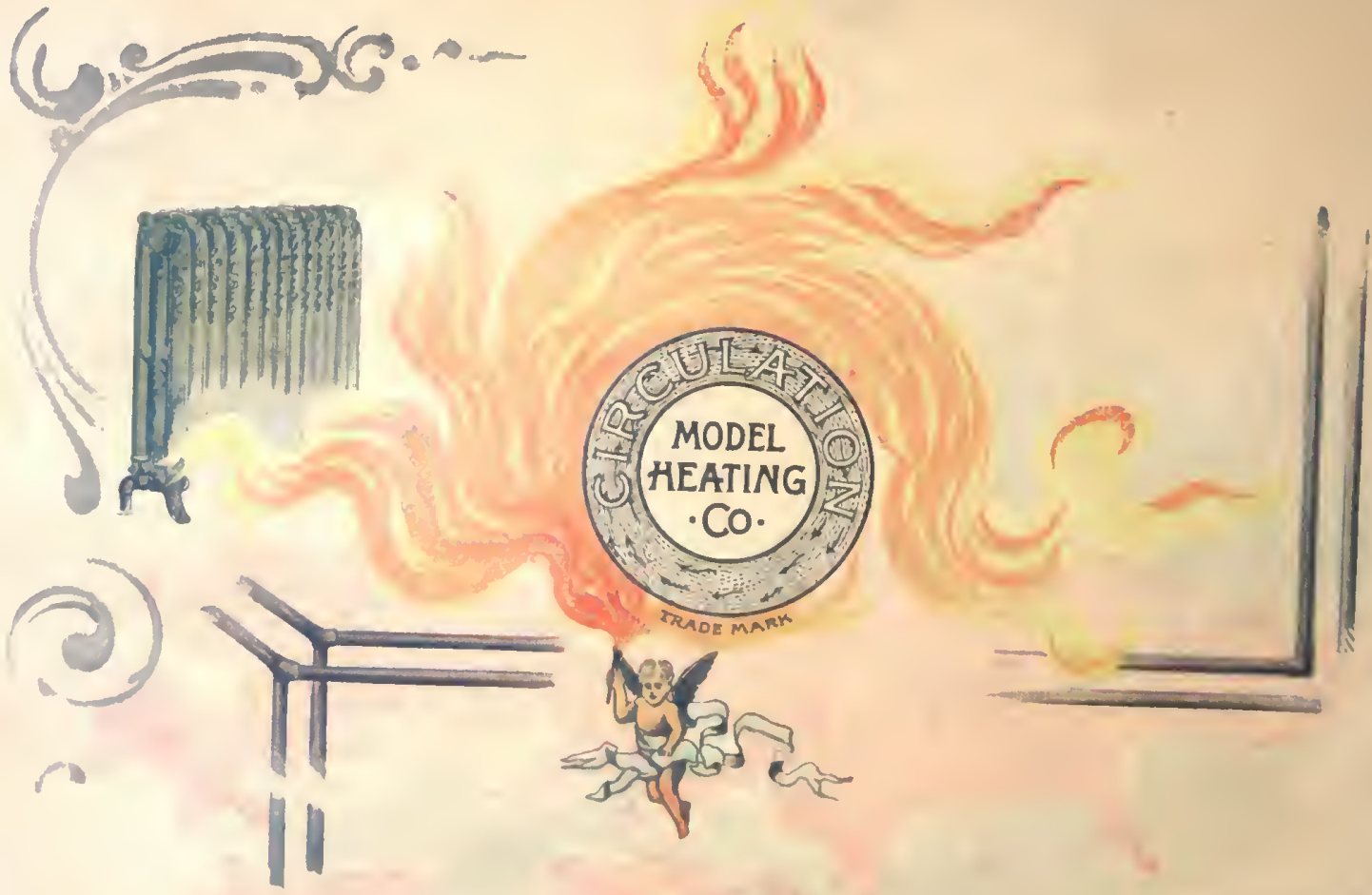
OF THE

MODEL WATER BOILERS.

No. of Boiler	12-3	18-3	22-3	18-4	22-4	18-5	22-5	30-4	30-5	30-6	30-7	40-6	40-7	40-8	50-7	50-8	50-9
Dimensions of Grate	12 x 14	18 x 14	22 x 14	18 x 21	22 x 21	18 x 28	22 x 28	30 x 21	30 x 28	30 x 35	30 x 42	40 x 35	40 x 42	40 x 49	50 x 42	50 x 49	50 x 56
No. and Size of Flow Openings	1-2	1-2½	1-3	2-2½	2-3	2-2½	2-3	2-3½	2-3½	3-3½	3-3½	3-4	3-4	3-4	4-4	5-4	5-4
No. and Size of Return Openings	1-2	1-2½	1-3	2-2½	2-3	2-2½	2-3	2-3½	2-3½	3-3½	3-3½	3-4	3-4	3-4	4-4	5-4	5-4
Height of Boiler to top of Outlet	48	48	48	48	48	48	48	59½	59½	59½	59½	62	62	62	67	67	67
Length of Boiler including Smoke Box	36	42	46	42	46	42	46	57	63	63	63	73	73	73	83	83	83
Width of B. includ'g W't'rfr'nt Connecs.	22	22	22	29	29	36	36	32	39	46	53	48	55	62	55	62	69
Depth of Ash-Pit	9	9	9	9	9	9	9	11	11	11	11	11	11	11	11	11	11
Height of Base	12	12	12	12	12	12	12	14	14	14	14	14	14	14	14	14	14
Height from Floor to Centre of Return	14	14	14	14	14	14	14	17	17	17	17	17	17	17	17	17	17
Size of Smoke Pipe	7	7	8	8	9	9	10	10	12	13	14	14	15	16	17	18	19
Direct Radiation Boiler will supply	300	450	550	650	750	850	1050	1350	1775	2200	2625	3000	3600	4200	4700	5600	6600



WHERE THE MODEL BOILER IS MADE.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